

Amendments to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in this application.

Listing of Claims:

1. (Currently Amended) An IFF ~~transponder apparatus~~ for ground applications, comprising:

[[-]]~~E~~ncoder an encoder for forming an interrogating or response sequence of pulses, and conveying the same to a UWB transmitter;

[[A]] an UWB transmitter for getting said interrogating or response sequence of pulses, forming a corresponding interrogating or response signal of a sequence of UWB pulses, and transmitting the same via a UWB transmitting antenna;

[[A]] a plurality of UWB receiving antennas, disposed away one from the other, for receiving either an interrogating signal or a response signal sent by another ~~transponder IFF apparatus~~;

[[A]] a decoder for getting from at least one of said UWB receiving antennas received signals, decoding the same, comparing the decoded signal with a bank of pre-stored signals, and determining whether a received signal is an interrogating or response signal; and

[[A]] a processing unit for, upon receipt of a signal of response signal to an interrogation interrogating signal sent by the present ~~transponder IFF apparatus~~, calculating the location of the responding ~~transponder IFF apparatus~~ by:

a. Determining determining the range R by the time delays between the interrogating and response signals;

b. Determining determining the direction vector to the responding ~~transponder IFF apparatus~~ by evaluating the time differences between arrival of each response pulse to a plurality of receiving antennas; and

c. determining the identity of the responding ~~transponder IFF apparatus~~ by checking the received sequence of UWB pulses, assuming that the sequence of each ~~transponder IFF apparatus~~ is unique.

2. (Currently Amended) An transponder IFF apparatus according to claim 1, wherein the determining of the range R to the responding transponder IFF apparatus is determined by performing:

$$\frac{\left[(T_r - T_s) - T_{proc} \right] c}{2} = R$$

wherein T_r is the time of receipt of the first pulse of the response signal at the present transponder IFF apparatus, T_s is the time of transmitting the first pulse of the interrogation interrogating signal by the present transponder IFF apparatus, T_{proc} is the duration required for the interrogated transponder IFF apparatus to process the interrogation interrogating signal, until transmitting the response signal;
and the determining of the direction vector to the responding transponder IFF apparatus is determined made by [[by]] performing:

$$\cos \theta = \frac{c\Delta T}{d}$$

wherein ΔT indicates the time difference of receipt of a same response pulse at a first receiving antenna and at a second receiving antenna, c is the speed of light, d is the distance between the said two receiving antennas, and θ is the angle between the said direction vector and a line connecting said two receiving antennas.

3. (Currently Amended) An transponder IFF apparatus according to claim 1 comprising three receiving antennas that are disposed at tips of a triangle.

4. (Currently Amended) An transponder IFF apparatus according to claim 3 for use by an infantry soldier wherein the receiving antennas are disposed on the helmet of the soldier.

5. (Currently Amended) An transponder IFF apparatus according to claim 4 wherein the receiving antennas are printed on the helmet.

6. (Currently Amended) An transponder IFF apparatus according to claim 3 wherein the transmitting antenna being is located at the center of the triangle.
7. (Currently Amended) An transponder IFF apparatus according to claim 1 wherein the UWB transmitter and the transmitting antenna are formed by two cones, a charging circuitry for charging the cones, and a fast switch for discharging the cones in order to produce a UWB pulse.
8. (Currently Amended) An transponder IFF apparatus according to claim 1, for use on a vehicle.
9. (Currently Amended) An transponder IFF apparatus according to claim 8 comprising at least three receiving antennas and one transmitting antenna disposed at different locations on the vehicle.
10. (Currently Amended) An transponder IFF apparatus according to claim 9 wherein the receiving antennas on the vehicle are omni-directional antennas.
11. (Currently Amended) An transponder IFF apparatus according to claim 9 wherein the receiving antennas on the vehicle are directional antennas.
12. (Currently Amended) An transponder IFF apparatus according to claim 9 wherein some of the receiving antennas on the vehicle are omni-directional antennas and some of the antennas are directional antennas, all arranged to cover the area of interest.
13. (Currently Amended) An transponder IFF apparatus according to claim 1 having two modes of operations, an interrogating mode in which the transponder IFF apparatus interrogates the identity, range, and azimuth of another transponder IFF apparatus in the area of interest, and a responding mode in which the IFF apparatus responds to an interrogation issued by another transponder IFF apparatus.

14. (Currently Amended) An ~~transponder~~ IFF apparatus according to claim 1 wherein each receiver is adapted to receive pulses of responding signal that are above a predefined threshold level, the predefined threshold level being a level which is above the noise level.

15. (Currently Amended) A method for determining by an interrogating ~~transponder~~ IFF apparatus the azimuth to an interrogated ~~transponder~~ IFF apparatus, comprising the steps of:

- a. Providing providing within the interrogating ~~transponder~~ IFF apparatus a transmitting antenna, and at least two receiving antennas, disposed away one from the other;
- b. Transmitting transmitting by the interrogating ~~transponder~~ IFF apparatus a coded interrogation signal, comprising a plurality of UWB pulses;
- c. receiving at the interrogated ~~transponder~~ IFF apparatus the interrogating interrogation signal, producing a response UWB signal, and transmitting the same to the interrogated ~~transponder~~ IFF apparatus;
- d. receiving by at least two receiving antennas within the interrogating ~~transponder~~ IFF apparatus said response UWB signal, and calculating the direction to the interrogated ~~transponder~~ IFF apparatus by evaluating the time differences between arrivals of each response pulse to a plurality of receiving antennas.

16. (Currently Amended) A method according to claim 15, wherein the direction determination is made by:

$$\cos \theta = \frac{c\Delta T}{d}$$

wherein ΔT indicates the time difference of receipt of one response pulse at a first receiving antenna and at a second receiving antenna, c is the speed of light, d is the distance between the said two receiving antennas, and θ is the angle between the said direction vector and a line connecting said two receiving antennas, assuming $d \ll R$, wherein R is the distance between the interrogating ~~transponder~~ IFF apparatus and the interrogated ~~transponder~~ IFF apparatus.

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17. (New) An IFF apparatus according to claim 1, wherein the IFF apparatus has two modes of operations, a first mode operating as an interrogating apparatus, and a second mode operating as an interrogated apparatus.
18. (New) An IFF apparatus according to claim 17, wherein the IFF apparatus operates as a transponder in the second mode.